FSA Integration Partner

United States Department of Education

Federal Student Aid

EAI Production Architecture Performance Report II

Task Order #117

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1 Introduction

1.1 Summary

The purpose of this report is to document the EAI Production Architecture Performance metrics for services performed in support of Task Order 117, EAI Release 4.0 during the period of January 1, 2003 through April 25, 2003.

Task Order 117 provides for operational support and maintenance of the EAI architecture and infrastructure. The EAI Core Operations personnel provide 24 hrs x 365 days a year support of the EAI Production Architecture. In the event of any EAI related production incident or alert, EAI Operations is engaged to troubleshoot and restore the operability of the system.

The EAI Production Architecture Performance Report is summarized in the following sections:

- ***Section 2:*** *EAI Architecture Availability* - Provides a summary of the EAI Production Architecture availability and major support events.
- ***Section 3:*** *EAI Operations Support Summary* – Provides a summary of support pages, bad data file transfer issues, and adhoc support requests.
- ***Appendix A:*** *EAI Issues Summary* - Documents the EAI Operations related issues that opened or closed during the reporting period.
- ***Appendix B:*** *EAI Operations Metrics – January 2003*
- ***Appendix C:*** *EAI Operations Metrics – February 2003*
- ***Appendix D:*** *EAI Operations Metrics – March 2003*
- ***Appendix E:*** *EAI Operations Metrics – April 2003*
- ***Appendix F:*** *EAI Architecture Availability Summary* – Documents the availability for the EAI Architecture components.

2 EAI Production Architecture Availability

The availability, or up time, of the EAI Production Architecture is a high level metric used to determine the overall health and stability of the architecture. The EAI Team works in conjunction with its data center counterparts to ensure the highest availability possible outside the normal, defined server maintenance windows.

2.1 Availability

The EAI Team operates with the informal availability target of 100%. This represents the ideal availability.

To provide a more accurate picture of the EAI Architecture availability, it is necessary to calculate the availability for each component (i.e., application interface, EAI server). The component availability, compared with a cumulative availability, provides a more accurate representation of availability and is the approach used for calculating this metric for the EAI architecture.

The key inputs for calculating the interface availability are based on:

- *FSA Server Maintenance Schedule*
- *Root Cause Analysis (RCA) documentation* - A RCA document is created for each major system event or outage and is the result of a System Restoration Team (SRT) being assembled by a Virtual Data Center (VDC) Availability manager in response to a Production outage or issue. Detailed information pertaining to each outage or issue is contained within each of these documents including total time of the outage or degradation of service.

2.1.1 Calculation

The architecture availability for each component is a simple calculation using the following variables:

$Total_H$ - Total Number of hours in Period
$Total_{MW}$ - Total Number of Scheduled Maintenance Window hours in Period
$Total_O$ - Total Number of Outage hours in Period

The calculation is as follows:

$$\frac{(Total_H - Total_{MW}) - Total_O}{(Total_H - Total_{MW})} * 100 = \% \text{ Availability}$$

To demonstrate the calculation, a sample interface availability is calculated for the period from September 27th through December 31st, with the cumulative, non-maintenance window outages equaling 5 hours.

E.g.

$$\frac{(2304 - 84) - 5}{(2304 - 84)} * 100 = 99.7 \% \text{ Availability}$$

The breakdown of each calculation for each variable:

- Total Number of hours ($Total_H$) in Period:

$Total_H$ = (Period End Date - Period Begin Date) * 24
= (12/31/02 - 9/27/02) * 24
= (96) * 24
$Total_H$ **= 2304 hours**

- Total Number of Scheduled Maintenance Window hours ($Total_{MW}$) in Period:

$Total_{MW}$ = Number of Sundays in Period * 6 hours
= 14 * 6
$Total_{MW}$ = **84 hours**

- Total Number of Outage hours ($Total_O$) in Period:

$Total_O$ = Sum of all outage hours
$Total_O$ = **5 hours**

2.1.2 Component Availability

The following table summarizes the EAI Production Architecture component availability.

Period = January 1, 2003 through April 25, 2003
$Total_H$ = **2760 hours**

Note: All application interfaces have a dependency on the EAI Bus and therefore any EAI Bus service outage impacts all components. The EAI Bus supports transport of transactional data and files between Trading Partner applications. The clustering of the EAI Bus servers allows fail over of all transactional data to the non-affected server. Due to software configuration constraints, file transfers are routed through either of the EAI Bus servers (SU35E3 or SU35E14). The Trading Partner application is configured to transfer files using either SU35E3 or SU35E14. There is no fail over to the other server in the event of a MQ Series outage. If a server experiences an outage, all Trading Partner file transfers configured for that affected server will be queued up until the issue is resolved. Once restored, the messages will be transferred normally. Therefore, the availability of all components will be affected for the length of the service outage for SU35E3 or SU35E14.

Refer to ***Appendix F*** – *EAI Architecture Availability Summary* for a detailed summary of the availability of the architecture components.

2.2 Major Production Events

Production events are defined as system affecting occurrences ranging in severity from Degradation of Service to a Service Outage. The following tables summarize the major events encountered in the EAI Production architecture for this reporting period and separated in events that are EAI related and non-EAI related. EAI related events are issues that have occurred in Production that are problems identified in the EAI architecture (i.e., MQSeries, Data Integrator) . Non-EAI related events are issues that affect the EAI architecture, but where the EAI architecture is not the source of the issue (i.e., hardware failure, network outage, etc.). The information contained in these tables are used to calculate the availability metrics contained within ***Appendix F*** *– EAI Architecture Availability Summary*.

EAI Related Events

					Length of Outage		
Date	Description	Interface Affected	Transactional Data Impact	File Transfer Impact	Hours	Mins	Total hours
1/11/2003	MQSeries on SU35E3 hung*	SU35E3	Degradation of Service - All real-time transactions automatically routed to clustered EAI server (SU35E14).	Service Outage - All bulk file transfers via Data Integrator were queued until MQ Series was restarted.	1	45	1.75
1/25/2003	MQSeries on SU35E3 hung*	SU35E3	Degradation of Service - All real-time transactions automatically routed to clustered EAI server (SU35E14).	Service Outage - All bulk file transfers via Data Integrator were queued until MQ Series was restarted.	2	8	2.13
2/8/2003	MQSeries on SU35E3 hung*	SU35E3	Degradation of Service - All real-time transactions automatically routed to clustered EAI server (SU35E14).	Service Outage - All bulk file transfers via Data Integrator were queued until MQ Series was restarted.	1	45	1.75
2/15/2003	MQSeries on SU35E3 hung*	SU35E3	Degradation of Service - All real-time transactions automatically routed to clustered EAI server (SU35E14).	Service Outage - All bulk file transfers via Data Integrator were queued until MQ Series was restarted.	1	10	1.17
3/23/2003	Required MQSeries files were deleted causing an FMS interface problem	HPV2	None, Problem was encountered during a negotiated change window	None, Problem was encountered during a negotiated change window	0	0	0.00

* Note: The recurring semaphore issue ("MQSeries on SU35E3 hung") plaguing SU35E3 has been identified after numerous MQSeries traces were submitted to IBM. The issue is caused by queues with large number of messages. Processes have been implemented to monitor and keep the number of messages per queue to a minimal number if not at zero.

Non EAI Related Events							
					Length of Outage		
Date	Description	Interface Affected	Transactional Data Impact	File Transfer Impact	Hours	Mins	Total hours
1/2/2003	The CICS DPL bridge on CPS was down	CPS-FAFSA	Information stored on CPS was unavailable to FAFSA users. Users received a message, 'We are unable to confirm your request: Try again later' and their transaction was queued. Once fixed, all queued transactions were processed successfully.	None.	0	43	0.72
1/7/2003	The CICS DPL bridge on CPS was down	CPS-FAFSA	Information stored on CPS was unavailable to FAFSA users. Users received a message, 'We are unable to confirm your request: Try again later' and their transaction was queued. Once fixed, all queued transactions were processed successfully.	None.	0	8	0.13
1/10/2003	The CICS DPL bridge on CPS was down	CPS-FAFSA	Information stored on CPS was unavailable to FAFSA users. Users received a message, 'We are unable to confirm your request: Try again later' and their transaction was queued. Once fixed, all queued transactions were processed successfully.	None.	0	28	0.47

Non EAI Related Events							
					Length of Outage		
Date	Description	Interface Affected	Transactional Data Impact	File Transfer Impact	Hours	Mins	Total hours
1/11/2003	The CICS DPL bridge on CPS was down	CPS-FAFSA	Information stored on CPS was unavailable to FAFSA users. Users received a message, 'We are unable to confirm your request: Try again later' and their transaction was queued. Once fixed, all queued transactions were processed successfully.	None.	1	12	1.20
1/21/2003	The CICS DPL bridge on CPS was down	CPS-FAFSA	Information stored on CPS was unavailable to FAFSA users. Users received a message, 'We are unable to confirm your request: Try again later' and their transaction was queued. Once fixed, all queued transactions were processed successfully.	None.	0	34	0.57
2/12/2003	Mainframe and EAI MQ Series Support reported contention for the production DB2 data bases between the online FAFSA sessions the OAM Image Copies, and the SAIG batch job	CPS-FAFSA	Approximately 5000 FAFSA users experienced timeouts when performing a school code lookup or submitting their application. No applications were lost.	None.	0	55	0.92
2/18/2003	A Jamaica disk on HPV1, used by EAI server SU35E3, physically failed. As a result, the file system /export/data/mqm mounted on HPV1, was unavailable to SU35E3	SU35E3	There was no outage. Some transactional traffic failed over to su35e14.	Larger batch transactions were delayed.	5	5	5.08

Non EAI Related Events							
					Length of Outage		
Date	Description	Interface Affected	Transactional Data Impact	File Transfer Impact	Hours	Mins	Total hours
3/3/2003	FAFSA transactions to CPSP were building up because the OAM OSMC task (copies Images to tape) was in the highest priority processing class and consuming all available CPU processing capacity	CPS-FAFSA	FASFA users were experiencing session time outs, but applications that were submitted to CPS were captured.	None.	0	18	0.30
3/8/2003	OAM OSMC storage group39 filled up which prevented additional images to be stored by the IDC application. This, in turn caused IDC MQSeries messages to fill up a system pageset that was shared between the IDC and FAFSA applications	CPS-FAFSA	Both the FAFSA online and online image store process were un-usable during this time	None.	3	50	3.83
3/18/2003	Loss of cluster objects for the repository queue manager	CPS-FAFSA	The FAFSA application was unavailable to users.	None.	4	53	4.88
3/27/2003	The autonomy properties file (/www/fotwdemo/autonomy) was missing on SU35E9	FAFSA	FAFSA Demo Prod School Code Lookup and search functions not available to users.	None.	0	59	0.98
4/10/2003	The cluster channels on the mainframe showed to be in a run state, however, on the servers, the channels showed to be stopped.	CPS-FAFSA	Users not getting confirmation responses on transactions. Also, during this time, FAFSA on the mainframe is unavailable to the users. This issue caused 1000+ messages to be stalled. All transactions for the mainframe were queued and processed once the channels became operational.	None.	1	5	1.08

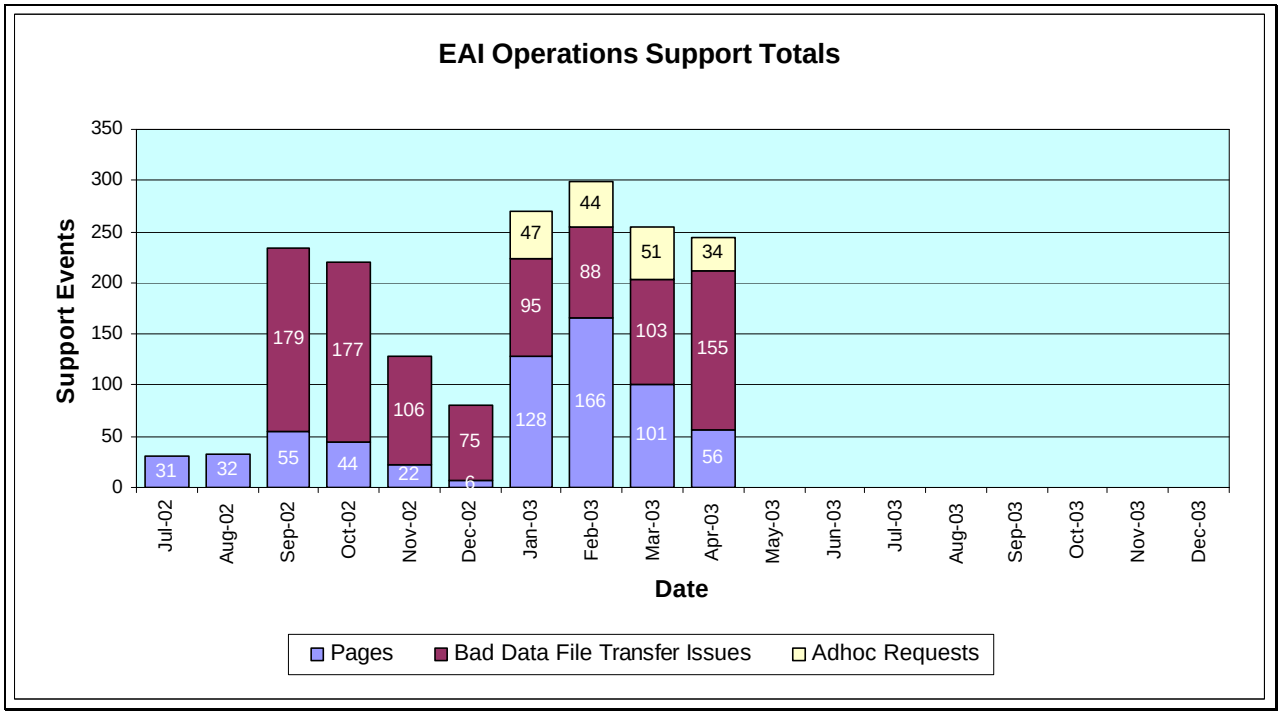
Of the 20.17 hours of Non-EAI related outage time, for SU35E3, 5.08 hrs is added to the 6.8 hrs of EAI related outage hours to give a Total outage of 11.88 or ~11.9 hrs.

Another 14.11 hrs is CPS-FAFSA related as in the spreadsheet. The remaining 0.98 hrs is related to an outage for the FAFSA Demo Prod environment. While hosted on a Production server and treated like a Production application, this is still a non-Production environment from a data perspective and the hours of outage are not considered in the overall availability.

In summary, 20.17 = 5.08 + 14.11 + 0.98 Thus accounting for the total Non-EAI related outage hours.

3 Support Summary

The EAI team provides support that can be categorized in three general areas: Production support pages, bad data file transfer issues, and ad hoc support requests. The following table summarizes the metrics currently collected for the support pages, bad data file transfer issues, and adhoc requests.



3.1 Support Pages

The above chart summarizes the support pages for this reporting period. Since January, the number of support pages has dramatically increased from 6 to 128 pages and peaked at 166 pages in February. This directly corresponds to the release of FAFSA 7.0. In March and April, a downward trend was observed and is expected to continue towards pre-FAFSA 7.0 numbers. This is the expected trend as the EAI Production architecture matures and interface anomalies are identified and resolved.

To provide greater insight to the areas of the architecture that have recurring errors or problems, we have implemented a mechanism to provide detailed MQ Series metrics. The MQ Series monitoring software (MQMON) sends an email for every MQ Series alert to the EAI Operations Support mailbox. The alert information contained in the email will enable more detailed analysis of pages (i.e., page time distributions, alerts by Queue Manager, alert type breakdown, etc). Refer to ***Appendices B-E*** – *EAI Operations Metrics– January – April 2003* for detailed metrics.

3.1.1 Pager Response Time

The EAI Service Level Agreement defines a response time for Production support to be within the range of 1hour to 3 days depending on the severity of the issue (High, Medium, Low). The table below summarizes the EAI Operations support pager response time statistics. Upon a page or call for a Production support issue, the EAI team typically responds immediately to all support pages and calls as demonstrated in the response time metrics.

Statistic	Value (minutes)
Minimum	1.00
Median	4.00
Average	7.33
Maximum	36.00

3.2 Bad Data File Transfer Issues

The bulk of the application interfaces consist of file transfers over Data Integrator. As expected, there are file transfer issues that occur. The most common cause for transfer issues arise in the SAIG to COD interface. Schools send files via SAIG to COD. Often the file formats and data are not correct and the file transfer fails. The EAI Team provides the research and analysis into the specific cause of the file transfer issue. Frequently the files are not in the correct format or layout. This root cause information is communicated to COD Customer Service so that the School can fix and resend the files. In addition the team provides support for file resend requests.

In the EAI Operations Support Totals diagram on page 11, the number of transfer issues has stayed relatively stable over time with the exception of April where there was a marked increase from 103 in March to 155 in April. This increase corresponds to the COD 2.0 release. As the release matures, the number of requests is expected to decline. Efforts are currently in place to better coordinate between SAIG, EAI, and COD teams to improve the support provided for file transfer issues. Refer to ***Appendices B-E*** *– EAI Operations Metrics – January – April 2003* for detailed metrics.

3.3 Adhoc Requests

The EAI Team provides support for adhoc requests. These requests vary in complexity from the simple status or configuration questions to creation of environments and extracurricular testing support.

In the above table, EAI Operations Support Totals, the number of adhoc requests has stayed relatively stable over time. Refer to ***Appendices B-E*** *– EAI Operations Metrics – January – April 2003* for detailed metrics.